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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Suan Jeung Boon

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EXAMINER

NGUYEN, DILINH P

ART UNIT

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2893

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/723,474	Applicant(s) BOON, SUAN JEUNG	
	Examiner DILINH P. NGUYEN	Art Unit 2893	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-24 and 51-89 is/are pending in the application.
- 4a) Of the above claim(s) 62-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-24, 51-61, 88-89 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action responds to the amendment filed on 4/14/2008.

Acknowledgment

The amendment filed on 4/14/08 responding to the Office action mailed on 12/13/07, has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, claims 19-24, 51-61 and 88-89 are pending in the application, in which, claims 62-87 were previously withdrawn from consideration.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 19 and 21-24, 52, 54, 56-58, 60-61 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Capote et al. (U.S. Pat. 6121689) in view of Gillespie (U.S. Pat. 5898858) and Bolde et al. (U.S. Pat. 6153505).

- Regarding claim 19, Capote et al. disclose a flip chip includes:

a first semiconductor device 10 having a first side and a second side, the first side comprising a first array of connection pads 24, the connection pads electrically coupled to circuits on the first semiconductor device;

an adhesive layer 22 covering the first side of the first semiconductor device with a first surface of the adhesive layer contacting the first side, the adhesive layer having an array of column-shaped openings 28 (figs. 6 and 7) substantially aligned with one or more connection pads of the first array of connection pads; and

a conductive material 30 substantially filling the array of openings (figs. 3, 6-7, column 7, lines 60 et seq.)

Capote et al. do not disclose a processor and the adhesive layer having a chamfer at a second surface of the adhesive layer at each of the column-shaped opening.

However, Gillespie discloses an electronic system comprising: a processor and a memory controller are integrated into a BGA chip package (fig. 3, abstract) in order to provide a memory support for ball grid array microprocessor package (abstract).

Bolde et al. disclose a semiconductor device comprising: a chamfer 12 in an adhesive layer 1; at least one column-shaped opening includes a conductive material 9 forming a conductive column within the at least one column-shaped opening, the conductive material in direct contact with the adhesive layer 1 and extending through the chamfer 12 to the first surface of the adhesive layer within the column shaped opening (fig. 2A, column 4, lines 7-10) in order to improve the reliability for the semiconductor package (fig. 3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a processor and the and the adhesive layer having a chamfer at a second surface of the adhesive layer at each of the column-

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shaped opening, wherein the conductive material extending through the chamfer to the first surface of the adhesive layer within the column shaped opening as taught by Gillespie and Bolde et al. in order to provide a memory support for the microprocessor package and improve the reliability for the semiconductor package.

- Regarding claim 21, Capote et al. disclose that the adhesive layer 22 is comprised of film layer (fig. 3, column 8, lines 12-18).
- Regarding claim 22, Capote et al. disclose that the adhesive layer includes a curable, fluid material (fig. 3, column 8, lines 17-18).
- Regarding claim 23, Capote et al. disclose that the conductive material is solder 30 (fig. 7, column 9, lines 3).
- Regarding claim 24, Capote et al. disclose that the conductive material is cylindrical in shape (fig. 7).
- Regarding claim 52, Capote et al. disclose that the adhesive layer includes a thermoplastic material (column 22, lines 16-17).
- Regarding claim 54, Capote et al. discloses that the adhesive layer 22 is applied to the chip in either liquid or adhesive tape form; therefore, the adhesive layer includes a pressure-sensitive material (column 8, lines 17-18).
- Regarding claim 56, Capote et al. disclose that the conductive material includes a conductive paste (column 3, lines 54-55) that hardens upon curing.
- Regarding claim 57, Capote et al. disclose that the conductive material includes a conductive that hardens upon curing and it would have been obvious to one

having ordinary skill in the art to have the conductive material includes a conductive gel.

- Regarding claim 58, Capote et al. discloses that the conductive material 30 is column-shaped (fig. 7).
- Regarding claim 60, Capote et al. disclose that the conductive material 30 is flush with a surface of the adhesive layer 22 opposite the first surface of the adhesive layer (fig. 8).
- Regarding claim 61, Capote et al. disclose that the conductive material 30 protrudes beyond a surface of the adhesive layer 22 (fig. 7).
- Regarding claim 88, Capote et al. disclose that the conductive material 30 and the adhesive layer 22 are free from an underfill (fig. 6).

3. Claims 20, 55 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Capote et al. (U.S. Pat. 6121689) in view of Gillespie (U.S. Pat. 5898858) and Bolde et al. (U.S. Pat. 6153505) as applied to claim 19 above, and further in view of Toyosawa et al. (U.S. Pat. 6337257).

Capote et al. Gillespie and Bolde et al. substantially disclose all the limitations as claimed above except for a protective material substantially covering the second side of the semiconductor device.

However, Toyosawa et al. disclose a semiconductor package comprising a second surface 36 of a semiconductor chip 32 are in contact with a protective tape (cover fig., column 12, lines 28-30). Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to modify the device

structure of the above combination by having a protective material covering the second side of the semiconductor device because as taught by Toyosawa et al., such protective material would protect and reinforce the back surface of the semiconductor chip for use in a semiconductor package (column 12, lines 28-30).

- Regarding claim 55, it would have been obvious to form the protective coating or the protective tape includes an epoxy.
- Regarding claim 59, Toyosawa et al. disclose the second side of the first semiconductor device includes a bonding layer (column 12, lines 28-30).

4. Claims 51 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Capote et al. (U.S. Pat. 6121689) in view of Gillespie (U.S. Pat. 5898858) and Bolde et al. (U.S. Pat. 6153505) as applied to claim 19 above, and further in view of Wieserman et al. (U.S. Pat. 5126210).

As discussed in details above, Capote et al. Gillespie and Bolde et al. substantially disclose all the limitations as claimed above except for the adhesive layer includes an elastomer or a thermoset material.

However, Wieserman et al. disclose a device comprising: an adhesive layer includes an elastomer (column 7, lines 37-38) or the adhesive layer includes a thermoset material (column 7, lines 37-41).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the adhesive layer includes an elastomer or a thermoset material as taught by Wieserman et al. into the device of the above combination, for providing a different application for the semiconductor package.

Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

5. Claim 89 is rejected under 35 U.S.C. 103(a) as being unpatentable *Capote et al.* (U.S. Pat. 6121689) in view of *Gillespie* (U.S. Pat. 5898858) and *Bolde et al.* (U.S. Pat. 6153505) as applied to claim 19 above, and further in view of *Goldstein* (U.S. Pat. 5528080).

As discussed in details above, *Capote et al.*, *Gillespie* and *Bolde et al.* substantially disclose all the limitations as claimed above except for a head of the conductive column recessed below the second surface of the adhesive layer.

However, *Goldstein* discloses a device comprising: a plurality of conductive column 94 within the at least one column-shaped opening, wherein the conductive column having a head exposed through the column-shaped opening, the head recessed below a second surface of the adhesive layer 91 (cover fig.).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a head of the conductive column recessed below the second surface of the adhesive layer as taught by *Goldstein* into the device of the above combination, in order to protect the head of the conductive column in the recess of the adhesive layer (cover fig.).

Response to Arguments

Applicant's arguments with respect to claims 19-24, 51-61 and 88-89 have been considered but are moot in view of the new ground(s) of rejection. See the new grounds of rejection above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DILINH P. NGUYEN whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00 AM - 6:30 PM (Monday-Thursday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on (571) 272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DLN

8/3/08

/Davienne Monbleau/

Supervisory Patent Examiner, Art Unit 2893